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| **Project 3.1.1 Design Specifications** |

Introduction

Although the work of a product designer relies heavily on imagination and creativity, it differs from the work of an artist in that a product designer typically has functionality or marketability in mind. An artist may have the freedom to put together any combination of materials, colors, and textures formed into any size or shape to create an end product without regard to function. A product designer, in contrast, must work within multiple constraints and must constantly focus on both the form and function of the final product to ensure that the final design meets all of the requirements necessary to make the product successful.

Engineers use a written document, called a design specification, to clearly define the features and performance needed in order for a design to successfully solve a problem. Writing a design specification occurs as soon as the problem has been defined and is essential to the process of generating potential design solutions. The design specification explicitly states the criteria that the final solution must meet and the constraints that will be imposed on the design solution.

You have already written a Problem Statement and a Statement of Purpose. Based on this work and your research, you will create a design specification for your product.

Equipment

* Engineering notebook
* Design Specification presentation
* Internet access

Procedure

Consult with your customer(s) or intended customer(s) and complete the following in your engineering notebook. Note that an example design specification (which includes more criteria than listed below) is available at <http://www.ider.herts.ac.uk/school/courseware/design/pds/example.html>. Use the information you gather to craft your design specification.

1. Who is the target consumer?

Divide the following list of criteria among your team members. Each team member will then identify specific requirements necessary for a successful solution related to each assigned element. Be as specific as possible and include measurable values where applicable. For example, use “Within one second the device must warn the vehicle driver and disengage the cruise control when the car attains a distance of less than 50 ft directly between itself and another vehicle” rather than “The device must warn the driver and slow the vehicle when the car is too close to an object.” Be sure to identify the source(s) of the information on which you base each constraint. Add additional criteria as needed.

**Design Specifications**

1. Customer Needs. What does the customer want/need?

Based on research, the intended customers want a product that will prevent gum from sticking to their shoes.

1. Performance. What must the product be able to do? Be specific.

The product should be able to prevent any chewed gum that is stepped on from sticking to the shoe.

1. Target Cost. What is the anticipated cost to the consumer for this product?

We are not exactly sure of this yet, since we need discover how much it would cost to make and we need also finish analyzing all the surveys to see what the customer would consider a good price.

1. Size and Weight. What size should the product be, or what restrictions to size exist? What are the weight restrictions on the product?

Our product will always be limited by size and weight. It has to be on the bottom of a shoe, so it must come in different sizes or be customizable. It has to be light enough and thin enough not to hinder walking.

1. Aesthetics. Are there preferences in the appearance features of the product (color, surface treatment, shape, material)? If so, describe them.

It would be in our best interest to provide a clear version (transparent) and perhaps a more stylish option (patterns and various colors).

1. Materials. Is there a specific material or materials that must be used? If yes, describe it.

Most of the challenges involved in this product’s development will be the creating of the actual material that prevents gum from sticking to it.

1. Safety and Legal Issues. Identify potential safety and legal issues that may arise from the use of this product.

We need to make sure that the shoe still provides enough traction for proper walking (walking without slipping) while still resisting the gum.

1. Ergonomics. Identify considerations for the ergonomics of the product.

Since our product goes on the bottom of shoes, it must not interfer with how the customer moves in their shoes. The shoes must still be comfortable. If the customer slips more than usual, then they will most likely not use our product.

1. Operating Environment. Identify the environmental conditions relevant to the manufacture and use of the product (temperature, corrosion potential, dust or dirt, pressure, humidity, vibration, noise, degree of abuse, etc.).

Our product is aimed at the outside urban environment. It needs to stand up to any weather conditions that would be present in a large city. It does not need to stand up against “extreme weather conditions such as hurricanes or blizzards, but never the less, duribility is important.

1. Global Environment. Will the product include any toxic or dangerous substances? What is the plan for disposal of the product at the end of its useful life?

As of right now, we do not foresee the need to use any known dangerous or toxic chemicals in our product. If it turns out that our product is a spray, then it would be flammable (from the aerosol).

1. Service Life. What is the required service life of the product?

We intend for our product to be disposable. It is not intended for long term use.

1. Product Life. What is the anticipated length of time that the product will be produced before it is replaced by a newer version or alternate product?

Our product looks to solve a very unique, specifc problem. I do not forsee any new product overtaking or replacing it soon.

1. Durability and Maintenance. Will the product require routine maintenance during its service life? If yes, answer the following.

Our product will not require maintenance because it is meant to be disposable.

* + 1. What specific parts of the product must have easy access for maintenance?
    2. What is the anticipated maintenance schedule?
    3. Are special tools required? How will they be acquired?
    4. Will replacement parts be required? How will they be acquired?

1. Additional Criteria
2. As a team prioritize your list of criteria from most important to least important.

1) Performance

2) Customer Needs

3) Safety and Legal Issues

4) Materials

5) Global Environment

6) Product Life and Durability

7) Ergonomics

8) Target Cost

9) Size and Weight

10) Operatory Environment

11) Aesthetics

1. As a team list applicable constraints that the designer must work within. Be specific. In other words, listing “time” as a constraint is not acceptable – you must state specifically how much time is available for the design process.
2. Resources (people, equipment, etc.)

Our resources are limited to what the three of us can do with the tools provided in the tech lab and our own homes and the advice provided by our instructor and the research we have done.

1. Budget

We do not have a specific amount in mind at the moment. Ideally we will create a great product with a small amount of money. If we can do this any

1. Time

We want to have a prototype done by Spring Break (3/23/12) and will definitly have a presenteation

1. Energy

We do not need to spend a lot of energy to make this product. The most energy that we will be using is probably during the making of our product. The machines we use to make our product will use enregy.

1. Materials

Different solutions will utilize different materials. In general the materials must be durable.

1. Manufacturing Process

We are going to first make our product in the school lab. Then after using multiple machines to cut and combine separate pieces we will have made a final product. The last step will be to package and distribute this product to different consumers.

1. Attempt to obtain validation of each criterion and constraint by multiple qualified representatives from each of the following groups: end-users, stakeholders, and field experts.
2. Create a design specification document for your project. Include the following.

* Name of Product
* Designer
* Target Consumer
* Design Specifications organized according to priority

Conclusion

1. Why is a design brief used in a design process?
2. What is the difference between a design specification and a product specification?
3. Identify at least five constraints that are common to most design problems.